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MEMORANDUM

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SUBJECT: I-90: Four Lakes to Idaho Stateline Operations Study
Goals, Operations Objectives, and Needs Memorandum

P16159-000

The I-90: Four Lakes to Idaho Stateline identifies current issues and needs related to safety in the corridor and develops an operations strategy for improving safety and managing travel flow over the next 10 years. This memorandum documents the goals, operations objectives, and needs for the 30-mile stretch of I-90 through metropolitan Spokane.

The memorandum is organized in two sections. The first section recommends goals and supporting operations objectives. The second section describes the needs identified on the corridor.

Goals and operations objectives were developed in coordination with Washington State Department of Transportation (WSDOT) staff and reflect input from the study's public engagement process and consideration of findings from the existing conditions analysis.

Project needs were defined through the study's existing conditions analysis as well as input from WSDOT staff, the Study Advisory Group (SAG), and public input at the Study Open House.

Goals and Operations Objectives

This section documents the recommended goals and operations objectives that will guide the selection and prioritization of operational strategies for the I-90 corridor. The purpose and general guidelines for developing the goals and operations objectives are as follows:

Goals help establish the direction of the plan. The goals establish high-level policy direction, but do not indicate how the goal will be achieved.

Operations Objectives are specific steps necessary to achieve the goals. In some cases, objectives follow the SMART criteria: specific, measurable, achievable, relevant, and time bound. Note that not all objectives fit this approach. The following questions determine if an objective meets the SMART criteria:

- Specific: Can it be used to answer questions about who is involved; what should be accomplished, where it will take place, when it will take place, and whether there are requirements or constraints?
- Measurable: Does the objective quantify how success will be measured?
- Attainable: Given the capacities of the agencies involved, is the objective likely to be achieved in the time frame given?
- Relevant: Is the objective something that should be done? And why?
- Time Bound: Does the objective define a specific timeframe for it to be accomplished?

The three recommended goals and supporting operations objectives for I-90 corridor operations improvement are shown below. Current WSDOT business practices, like least cost planning, will be utilized to identify strategies that will work toward meeting the objectives.

Goal 1: Improve safety performance for all I-90 corridor users

- a) Objective: Meet Washington State Safety Plan Target Zero goals of zero traffic fatalities and serious injuries by 2030.
- b) Objective: Reduce weather-related crashes.
- c) Objective: Reduce rear-end crashes.
- d) Objective: Reduce pedestrian and bicycle crashes at ramp terminals.

Goal 2: Enable efficient management and operations of the I-90 Corridor

- a) Objective: Improve clearance times for all lane blocking incidents.
- b) Objective: Improve construction and maintenance work zone management policy.
- c) Objective: Improve coordination between agencies and districts that maintain, operate or respond to incidents or planned events along the facility.
- d) Objective: Improve travel time reliability along the corridor.

Goal 3: Enhance traveler information along the I-90 Corridor

- a) Objective: Communicate real-time road conditions to travelers using any mode (passenger vehicle, freight, or transit).
- b) Objective: Enhance available pre-trip and en-route traveler information.
- c) Objective: Provide information about planned events or work zones that impact travel at least 24 hours prior to the occurrence.

This study will advance a variety of strategies to achieve these goals and operations objectives. Some strategies may be technically or politically complex to implement. These influencing factors will be considered in the evaluation screening of potential strategies so they can be recognized, and the opportunities and challenges can be addressed early in the process.

Examples of opportunities include:

- Existing policies that are supportive of transportation system management and operations
- A track record of cross- agency collaborative management including the Spokane Regional Transportation Management Center (SRTMC)
- An existing base of operations technologies (ex. Variable Messages Signs) and strategies (ex. Incident Response program) are currently in place and active.

Examples of challenges include:

- Political issues or public perception issues
- Availability of funding and resources
- Existing infrastructure such as roadway geometry may limit which strategies are viable.

As the study progresses, these opportunities and challenges will be considered to help determine the feasibility of various strategies and narrow to a recommended package of strategies to advance toward implementation.

I-90 Corridor Needs

This section documents the I-90 corridor needs identified based on the existing conditions analysis and stakeholder engagement. Stakeholder engagement included discussion with WSDOT project staff, input from a range of stakeholders at the SAG workshop, a public open house, and an online questionnaire that was distributed to WSDOT eastern region staff. The SAG workshop and public open house were both held on December 13, 2016.

Key findings highlighted in the existing conditions memorandum include:

- Crashes on I-90 steadily increased over the past five years.
- Crash hot spots on I-90 occur at:
 - Eastbound on-ramp from US 195
 - Eastbound and westbound on-ramps at the Hamilton Street interchange
 - Eastbound on-ramp from Freya Street
 - Interchange at Exit 280: Maple/4th/Walnut/Division including on-ramps, off-ramps and terminals intersections
 - Interchange at Exit 281: Division/Browne Street including on-ramps, off-ramps and terminals intersections
- Crashes occur on I-90 about 93% of the days during a given year.
- Traffic impacting Incidents have increased 40% over the past five years.
- Traffic volumes increased by about 10% between 2012 and 2015.
- Travel time reliability has steadily decreased, especially through the downtown Spokane section.
- Several interchanges through the downtown Spokane area and to the west are closely spaced and do not meet current performance expectations.
- Several on- and off-ramps, particularly through the downtown Spokane area, have merge and weave areas that are short and do not meet current performance expectations.
- Vehicle queues that regularly extend onto I-90 from at some off-ramps.

This memorandum identifies and prioritizes needs along the corridor based on the stakeholder input and findings from the existing conditions report. The needs are organized into three categories:

- Traffic Operations - Table 1
- Incident Management - Table 2
- Traveler Information and Performance Data -

- Table 3

Under the Traffic Operations category, the needs are organized into either corridor-wide or location-specific needs. An example of a corridor-wide need is “reduced incident clearance time throughout I-90 corridor,” whereas an example of a location-specific need is “short eastbound weaving section between Altamont and Freya.” A relative priority for each need is assigned based on input from the SAG workshop.

Table 1: Traffic Operations Issues and Needs

Identified Need	Description	Priority	Source
Corridor-Wide			
Need to better utilize local roadway network	<ul style="list-style-type: none"> • Separate local versus regional trips • Preserve parallel routes • Potential economic benefit 	High	SAG Workshop
Need to improve transit travel time reliability	<ul style="list-style-type: none"> • Reliable travel time • Not competitive right now 	High	SAG Workshop
Need to reduce distracted driving		High	SAG Workshop
Need to improve alternate routing during events		Medium	SAG Workshop
Need to provide safe pedestrian and bicycle crossings at I-90 interchanges	<ul style="list-style-type: none"> • Facilities for alternative modes to travel cross I-90 	Medium	SAG Workshop
Need to better manage traffic diverted to local streets during an incident on I-90		Medium	SAG Workshop
Need to improve work zone traffic control and work zone safety		Medium	SAG Workshop
Location-Specific			
Segment B – US 2 to Broadway Interchange (MP 277-286)			
Need to improve ramp and merge area geometry that do not meet current performance expectations	<ul style="list-style-type: none"> • US 195 eastbound on-ramp – short merge lane 	High	Survey/ SAG Workshop/ Existing Conditions Report
	<ul style="list-style-type: none"> • Eastbound Maple on-ramp (Exit 280) 	High	
	<ul style="list-style-type: none"> • Freya on-ramp westbound prior to Exit 283A 	High	
	<ul style="list-style-type: none"> • Eastbound from Hamilton on-ramp to Exit 283A (Altamont) – The short distance between the on and off ramps in this section creates weave and merge issues 	High	

Identified Need	Description	Priority	Source
	<ul style="list-style-type: none"> 2nd/Browne/Lincoln westbound (Exit 281 and 280B) – issues with weaving, aggressive driving, and closely spaced ramps 	Medium	
	<ul style="list-style-type: none"> 3rd Avenue (Altamont) eastbound (Exit 283A) during PM peak - On-ramp is bottleneck and short weaving section to 3rd/Thor/Freya off-ramp creates safety challenges 	Medium	
	<ul style="list-style-type: none"> Eastbound from 4th east of Freya - Lack of acceleration lane length (first on-ramp from 283B) 	Medium	
Need to reduce high severity crashes	<ul style="list-style-type: none"> West of MP 280 in the eastbound direction (eastbound direction has over double the frequency of high severity crashes) 	High	Existing Conditions Report
Need to reduce crashes	<ul style="list-style-type: none"> Eastbound crashes are concentrated through downtown Spokane (MP 279 – 284) in PM peak conditions Westbound crashes are more evenly distributed along Segment B (US2 Exit 277 to the Broadway Interchange Exit 286) Exit 280 (Maple/4th/Walnut) – Interchange with the highest number of crashes (365 crashes over five years from 2011 through 2015 at the ramps or terminal intersections of that interchange). 27.9% of all interchange crashes. Exit 281 - SR 2 at Browne Street/Division Street couplet (More than 100 crashes over five years from 2011 through 2015 identified in existing conditions) 	High	Existing Conditions Report
Need to reduce the use of I-90 for local trips	<ul style="list-style-type: none"> Sprague to Hamilton in both travel directions but especially westbound 	High	SAG Workshop
Need to improve Downtown traffic flow to help with I-90 flow	<ul style="list-style-type: none"> Provide wayfinding to parking One way streets cause confusion for drivers 	High	SAG Workshop

Identified Need	Description	Priority	Source
Need to reduce queuing on I-90 due to off-ramps	<ul style="list-style-type: none"> Division eastbound off-ramp (Exit 281) during PM peak (Monroe on-to Division – off-weave) 	High	SAG Workshop
	<ul style="list-style-type: none"> Maple/Walnut westbound on-ramp during PM (Exit 280A) - 4th to northbound Walnut movement congested by queuing on northbound Walnut. May be an opportunity to improve signal timing 	Medium	
	<ul style="list-style-type: none"> Maple/Walnut eastbound off-ramp (Exit 280) during PM peak. Note poor visibility for merging traffic 	Medium	
	<ul style="list-style-type: none"> Lincoln westbound off-ramp (Exit 280B) during PM peak 	Medium	
Need to provide shoulder area	<ul style="list-style-type: none"> Lack of shoulders between 195 (MP 279) and Hamilton (MP 282) 	Medium	
Need to reduce recurring congestion spreading	<ul style="list-style-type: none"> Freya interchange area (MP 283 area) Westbound at Sprague on-ramp (Exit 285) - Heavy congestion around Fancher and back from merge point 	Medium	SAG Workshop
Need to improve parallel/alternative routes to I-90	<ul style="list-style-type: none"> Focus parallel facilities include: 3rd, 2nd, Trent, Sprague 	Medium	SAG Workshop
Need to provide chain-up areas	<ul style="list-style-type: none"> Sunset Hill area (vehicles currently exit I-90 to chain up) 	Low	SAG Workshop
Segment C – Broadway Interchange to Barker Interchange (MP 286-293)			
Need to reduce crashes	<ul style="list-style-type: none"> Exit 291B - Sullivan Road. More than 100 crashes identified in existing conditions for both directions 	High	Existing Conditions Report
Need to reduce vehicle queuing on I-90	<ul style="list-style-type: none"> Argonne westbound off ramp (Exit 287) – seasonal fluctuation and peak queuing during summer months Barker eastbound (Exit 293) 	Medium	SAG Workshop
Segment D – Barker Interchange to State Line (MP 293-299)			
Need to improve roadway geometry	<ul style="list-style-type: none"> Westbound on ramp from Harvard (296) – short merge spacing causes speed differential between merging traffic and through traffic 	Medium	SAG Workshop
Need to reduce vehicle queuing on I-90	<ul style="list-style-type: none"> Eastbound Exit 296 Harvard – AM peak hour queuing on I-90 	Medium	SAG Workshop
	<ul style="list-style-type: none"> Eastbound Liberty Lake Exit 296 during the PM peak hour - Congestion at signal spills onto I-90 	Low	SAG Workshop

Table 2: Incident Management Issues and Needs

Identified Need	Description	Priority	Source
Need to reduce incident clearance time	<ul style="list-style-type: none"> Lessen clearance time 	High	SAG Workshop
Need to expand IRT coverage	<ul style="list-style-type: none"> More staff/trucks needed during peaks and weekends 	High	SAG Workshop
Need to develop TIM partnerships	<ul style="list-style-type: none"> More training, concurrence Build relationships with local law enforcement. Continued and improved building on WSP partnership Provide regular TIM training 	High	SAG Workshop
Planned and emergent work zones	<ul style="list-style-type: none"> Time of closure versus peak periods Preparedness to handle safety, minimize impact of work zones 	High	SAG Workshop
Need to develop traffic routing plans during events		Medium	SAG Workshop
Need to address wrong way drivers		Medium	SAG Workshop
Need to better manage weather incidents	Key locations: <ul style="list-style-type: none"> Sunset hill Broadway curve 	Medium	SAG Workshop
Need to improve incident response on the viaduct section of I-90	<ul style="list-style-type: none"> No space for clearance operations to occur, no safe towing locations 	Low	SAG Workshop

Table 3: Traveler Information and Performance Data Issues and Needs

Identified Need	Description	Priority	Source
Need to coordinate traveler information systems between agencies	<ul style="list-style-type: none"> Traveler information system coordination amongst agencies could be improved 	High	PMT
Need to educate travelers about current resources and improve utilization	<ul style="list-style-type: none"> Get word out about traveler information services (including non-WSDOT sites—e.g. Waze) 511 system TMC website utilization by travelers 	High	SAG Workshop
Need to improve traveler information to public during special events		High	SAG Workshop
Need to provide travelers with real-time parking information for the Downtown area	<ul style="list-style-type: none"> Confusion finding parking/unfamiliar drivers/special events 	Medium	SAG Workshop
Need to expand social media use for providing traveler information	<ul style="list-style-type: none"> Twitter, Facebook, etc. 	Medium	SAG Workshop
Need to expand available information	<ul style="list-style-type: none"> Meaningful, availability, parallel routes 	Medium	SAG Workshop
Need to pursue public/private partnership on traveler information	<ul style="list-style-type: none"> Weather sensors and congested areas 	Medium	SAG Workshop
Need to better utilize VMS when not in use for traveler information.	<ul style="list-style-type: none"> Option to use for public service announcements 	Medium	SAG Workshop
Need to provide more field devices to display traveler information.	<ul style="list-style-type: none"> Additional VMS 	Medium	SAG Workshop